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AUGUST 7, 1948

SCIENCE NEWSLETTER

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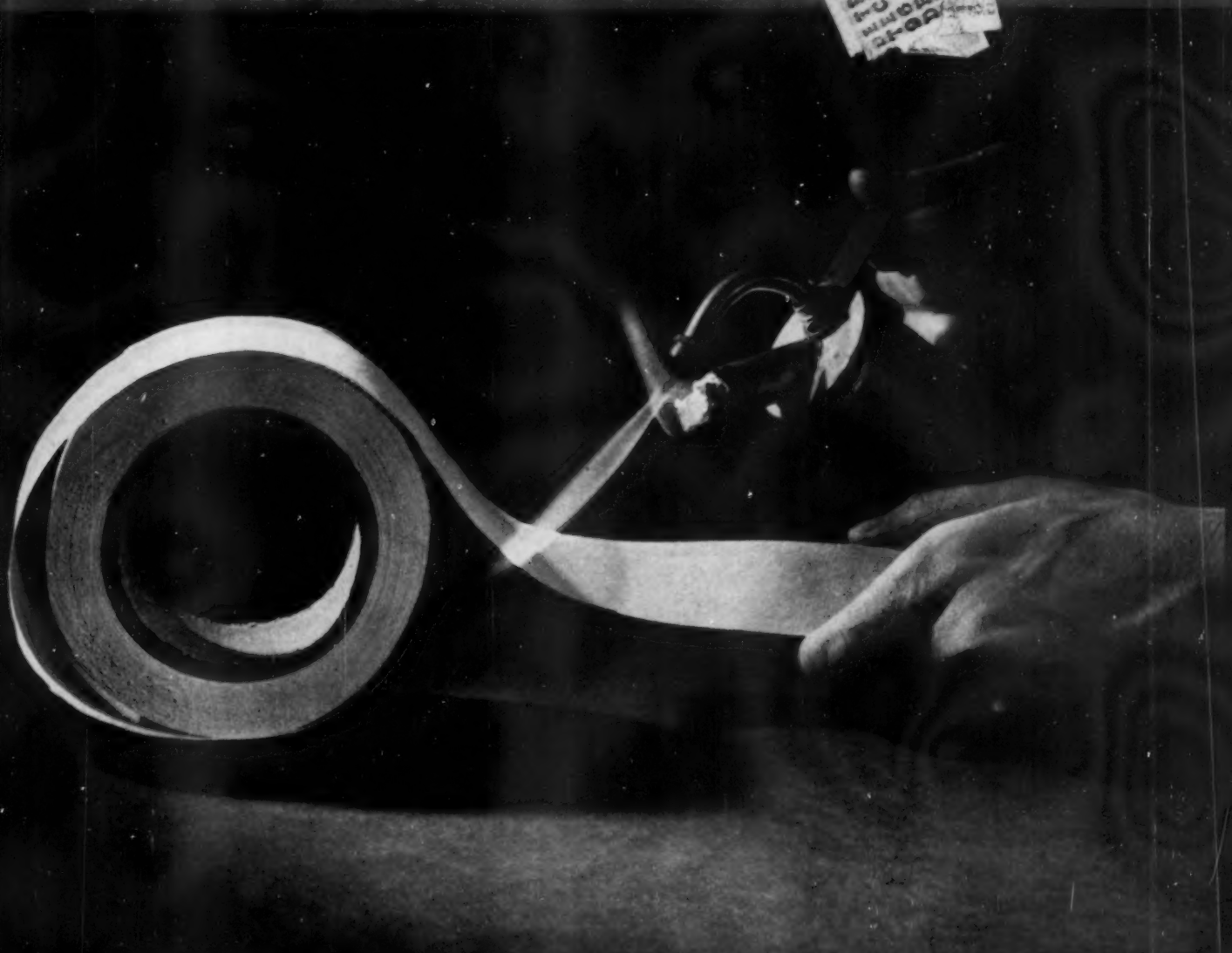
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Hot Insulation

See Page 83

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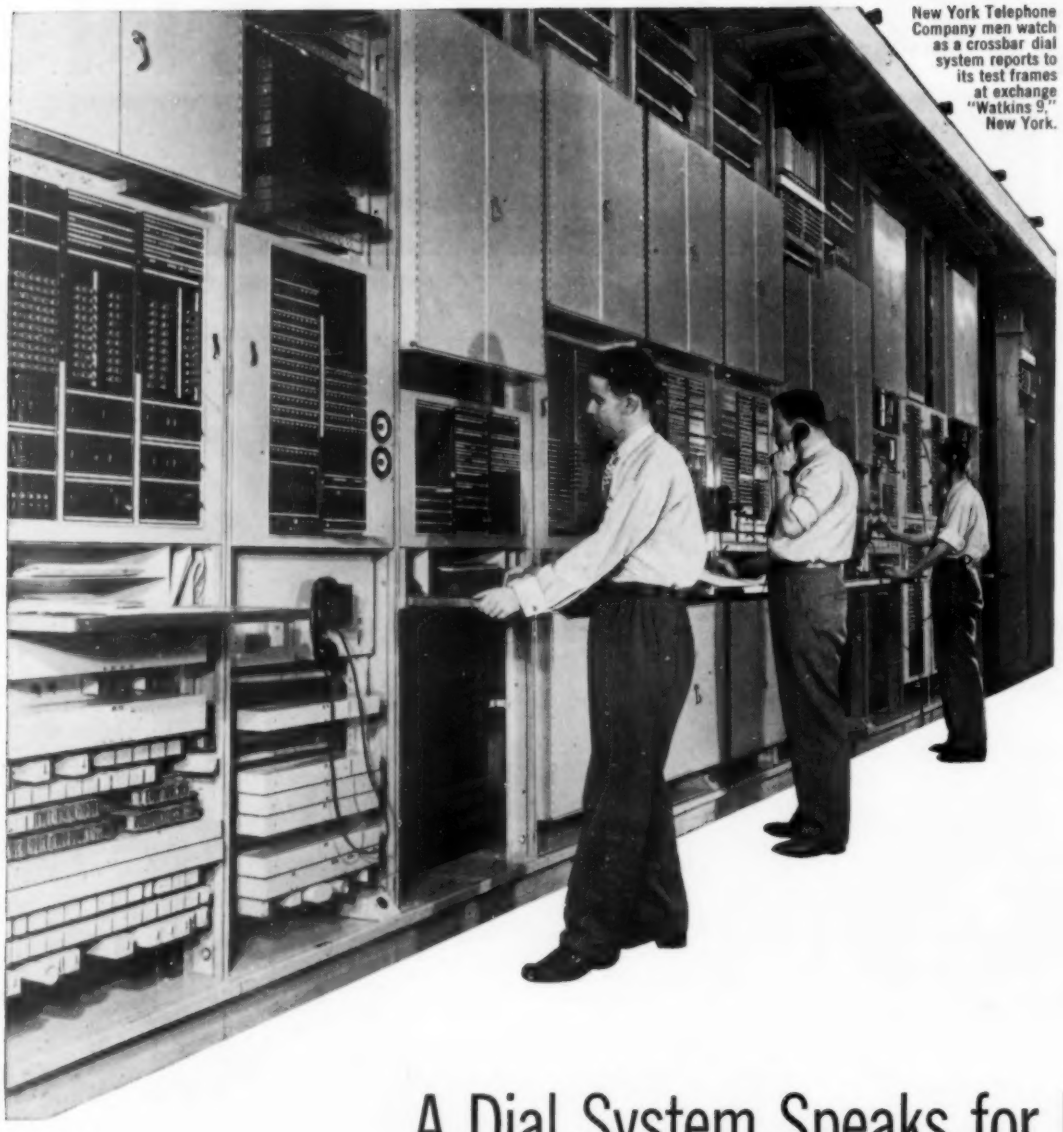

New York Telephone Company men watch as a crossbar dial system reports to its test frames at exchange "Watkins 9," New York.

A Dial System Speaks for Itself

As dial systems have been improved, so also have the means of keeping them at top efficiency. Even before trouble appears, test frames, developed in Bell Telephone Laboratories, are constantly at work sending trial calls along the telephone highways. Flashing lamps report anything that has gone wrong, and the fault is quickly located and cleared.

If trouble prevents one of the highways from completing your call, another is selected at once so that your call can go through without delay. Then on the test frames lights flash up telling which highway was defective and on what section of that highway the trouble occurred.

Whenever Bell Laboratories designs a new telephone system, plans are made for its maintenance, test equipment is designed, and key personnel trained. Thus foresight keeps your Bell telephone system in apple-pie order.

BELL TELEPHONE LABORATORIES *EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE*

PHYSICS

Heavy Nuclei Hit Earth

Evidence that there are high-powered and massive particles in cosmic radiation that bombard the earth from outer space has been gathered.

▶ THE EARTH is being bombarded from outer space with heavy-weight projectiles. The cosmic radiation at about 20 miles over your head includes atomic heavy-weights, not just light-weights, such as the hearts of hydrogen and helium atoms.

Evidence that there are heavy nuclei in cosmic radiation has been gathered in the Office of Naval Research project called "Skyhook" during which balloons carrying recorders have been sent above the roof of the atmosphere.

Atomic debris or "cinders of creation" are being rained upon the earth in much the same way that shooting stars are remnants of past planets.

Tracks of heavy particles were captured when physicists of the University of Minnesota and the University of Rochester sent cloud chambers and special photographic plates aloft in free balloons.

The clues left in these radiation recorders are evidence for hearts of heavy atoms, the heaviest as massive as hafnium (mass 180 times that of hydrogen and number 72 among the 96 known elements). The tracks are many times denser and heavier than those obtained from fragments produced in nuclear explosions.

This is rated as the most exciting discovery in cosmic rays of the year. The radiation has tremendous energies.

At two meetings in Pasadena, Calif., and Madison, Wis., the Rochester and Minnesota physicists have made preliminary reports and the *Physical Review* (July 15) carries their first published report. In the University of Minnesota group are Drs. F. Oppenheimer, E. P. Ney, E. J. Lofgren and Phyllis Freier, while the University of Rochester group includes Drs. H. L. Bradt and B. Peters.

Where are such high-powered and massive particles born out in the universe? A favorite idea is that they consist of the trash or debris that floats around in almost empty space, in the great galaxies of stars or between the galaxies. Very small differences in electric field operating over a considerable time (and the universe has plenty of time to spare) would give stray atoms tremendous accelerations such as are observed. This is a suggestion made by Dr. W. F. G. Swann, director of the Bartol Research Foundation, Swarthmore, Pa.

There is a possibility that the heavy energetic particles are born in the intense magnetic fields of the sun and are then shot to earth, but this is not the most widely held theory.

Science News Letter, August 7, 1948

SIX-JET BOMBER—Undergoing military tests at Wright Field, Ohio, by the U. S. Air Force, is the largest jet bomber of conventional design yet put in the air. It was built by Glenn L. Martin near Baltimore, Md., and for the present will be known as the XB-48. The X will be dropped when tests are completed and the bomber accepted. It will then go into production.

PHYSICS

All Helium in Meteorites Due to Cosmic Radiation

▶ ALL of the helium found in any meteorite was produced by cosmic radiation, Dr. Carl A. Bauer of the University of Michigan calculates.

Cosmic radiation has acted on all meteorites for the same amount of time—ever since the disruption of the parent planet to which these meteorites originally belonged —Dr. Bauer states. The proportion of a meteorite's mass lost in traversing the earth's atmosphere has little effect on the helium content, he reports in *Physical Review* (July 15).

It was Dr. Bauer who last fall announced that iron meteorites arriving from outer space are not seven billion years old, as previously estimated, but only about half that age.

At that time he pointed out that meteorites could be "artificially aged," extremely small amounts of helium gas contained in the bits of heavenly iron resulting from intense cosmic-ray bombardment in outer space. Heretofore it has been assumed that the helium was due to radioactive breakdown of uranium and thorium, the iron fragments having been in existence long enough as solids to allow the helium gas in them to be formed that way.

If cosmic radiation produced helium in small meteorites, the University of Michigan scientist reasons, then this process is sufficient to produce, in the same period of time, all the helium observed in any meteorite.

Science News Letter, August 7, 1948

ENGINEERING

Electrical Insulation Tape Neither Burns nor Chars

See Front Cover

▶ FINE PAPER-THIN TAPE, a high-temperature electrical insulation developed by Johns-Manville, will neither ignite, melt nor char. It is shown under blow-torch test on the cover of this week's SCIENCE NEWS LETTER.

Brought by the torch to a bright red heat, its thermal life and non-combustibility are demonstrated. Its use will make electrical installations safer from fires from short-circuits. Its trade name is Quinterra.

Science News Letter, August 7, 1948

Letters To The Editor

Interests Entire Family

We are new subscribers and took only a short subscription as a trial but the entire family finds the SNL of great interest.—Mrs. Fred J. Hoopes, Paoli, Pa. *Welcome to SNL family.*

Likes Our Style

I like the style and make-up of the periodical.—Louis A. Smith, New York City. *Thanks.*

Artistic Iceberg

The gigantic floating iceberg (Cover, SNL, June 26) resembles a human face.—A. R. Stuart, Brownsboro, Texas.

Not Enough Information

You mentioned a government bulletin in "Saving Cost in Houses" (SNL, June 26). The name and cost of the bulletin was not given. It would have helped if it had been —at least the name. The Supt. of Documents suggests it is: B. M. S. Strength of Houses, application of engineering principles to structural design, $1.50. Please another time give the name of the bulletin. —Anna E. Myers, Decatur, Ill. *Thanks for the suggestion. It will be followed as far as practical.*

Atomic Bomb's Effects

I have been trying for some time to obtain information on the biological effects of atomic bomb radiations.

To date I have received from authoritative sources only sugary notes which say in effect that little people like me ought not to worry about it; that I ought not to give credence to articles pretending to have final information, etc., etc., ad nauseam. I think that I have learned more from occasional articles in newspapers and magazines than I have from the sources which certainly should be able to tell us what is true, what is not true, and what we don't have any idea about at all so far.

I am a teacher of science. This is a tremendous responsibility, particularly today. If I am to teach biology, chemistry, physics, general science—if I am to open my mouth at all—I must have the truth about what is known so far. Our generation knows that we can help other generations only insofar as we give them the whole truth—as best we know it and as soon as we know it. Even if that truth happens to be "We just don't know," we are still compelled to give it—to provide every solid raw material for thought we possibly can for these young people. Only then have we discharged our responsibility to the future—only then can our new generations be equipped to do a better job of learning to think and work together all over the surface of this planet. . . .

We are in the middle of a vast, largely uncharted sea of information about atomic energy. I want my students to know how little we know, and to know for certain the few landmarks we have been able to glimpse through the fog. What they don't know *could* hurt them. I want them to have every possible scrap of truth about their uncharted sea; then when they take the tiller they may be able to sail a better course than we have done.—Frederick R. Korf, New York, N. Y.

As the facts are published, SNL prints and interprets them. See SNL for Aug. 9, Oct. 11, Nov. 8, and Nov. 29, 1947 and SNL, July 10, 1948. We shall try to do a roundup soon.

Question Box

ANTHROPOLOGY
Why are Guatemalan women taking to the "New Look"? p. 85

ASTRONOMY
Where does a sundial have a marker for midnight? p. 88

BIOCHEMISTRY
How can X-rays increase the penicillin supply? p. 94

BOTANY
Where is the real home of the waterlilies? p. 96

CHEMISTRY
What performance is claimed for new synthetic rubber treads? p. 87
Why do dyestuffs explode? p. 93

ENTOMOLOGY
What becomes of mosquitoes in winter? p. 94

MEDICINE
What danger lurks for ex-GIs who were treated for syphilis with penicillin? p. 92

NUCLEAR PHYSICS
How soon will atoms be running engines? p. 86

PHYSICS
What puts helium in meteorites? p 83

ZOOLOGY
Where are rattlesnakes tattooed, and why? p. 89

Photographs: Cover, Johns-Manville; p 83, Glenn L. Martin; p. 85, United Fruit Co.; p. 87 Westinghouse Research Lab.; p. 90, U. S. Public Health Service; p. 91, Fremont Davis.

INVENTION

Trap Entrance Devised For Rats in Garbage Can

➤ RATS visiting the garbage can in future may find a welcoming little door open to them—with death behind it. Herbert Tsai and Nicholas Chuy of Detroit have devised a trap entrance for garbage cans that lures the rat to go in, delivers a spine-breaking blow when he steps on a treadle, and deposits his carcass with the rest of the garbage. The patent number is 2,445,980.

Science News Letter, August 7, 1948

The *trumpeter swan,* with a weight of about 35 pounds, is the largest flying bird; the great bustard is almost as heavy.

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MEDICINE

Radioactivity Aids Ills

Elements made radioactive are used to treat a blood disease, to attack the cancer problem and to further knowledge of nerve disorders.

▶ RADIOACTIVE PHOSPHORUS from Oak Ridge is being used exclusively for the successful treatment of patients suffering from a blood disease called polycythemia vera at the University of Maryland Hospital in Baltimore, the Atomic Energy Commission revealed in its fourth semi-annual report to Congress.

In this disease, patients have too many red blood cells and in consequence their blood thickens, their spleens enlarge and they have the peculiar blue skin color called cyanotic. The disease extends over many years with the patient growing weak, developing dropsy and heart and kidney trouble.

An attack on the cancer problem with radioactive calcium is being made at Georgetown University Medical School in Washington. This important bone-building element stays in the body longer and is more apt to go to bones and soft tissues when it is in oil-soluble form than when in water-soluble form, the Georgetown scientists have found. Several forms of cancer concentrate calcium, the AEC report of the Georgetown studies states.

Better knowledge of nerve disorders and of thyroid gland function in health and disease are likely as a result of studies with radioiodine and radioactive phosphorus at the Johns Hopkins University in Baltimore as summarized in the AEC report.

New light on resistance to specific germ diseases may come from other studies at this institution and at the National Institutes of Health, U. S. Public Health Service, Bethesda, Md. At Hopkins, radioactive carbon (C14) has been successfully synthesized into an amino acid, arginine. This will be fed to mice in order to label the protein formed in the animals' blood serum.

The animals will then be immunized to some infectious disease and it is hoped the radioactive carbon will show whether the disease-fighting antibodies in their blood are composed of newly synthesized protein or of previously formed protein which has undergone rearrangement after the immunizing shots.

The Public Health Service studies on disease resistance center around use of radioactive carbon, phosphorus and arsenic in preparing radioactive antigens. The antigens are the substances in disease germs which call up disease-fighting antibodies in the blood.

Determining blood loss and blood needs of patients undergoing surgical operations may be done more quickly and accurately in future, if preliminary work with radioactive phosphorus is borne out by further studies. This work, the AEC report states, is being done at the Medical College of Richmond, Va.

Several anesthetics block the entrance of radioactive phosphorus into the red blood cell, studies at the University of Virginia, at Charlottesville, show. This, the report states, "points to a possible general action of anesthetics and may aid in explaining the action of sleep-producing drugs."

Better knowledge of what vitamins do in the body may come from studies at Howard University in Washington, in which radioactive phosphorus is being used. At present the studies are concerned with learning how the vitamins affect the utilization of this important chemical in the chick embryo.

Science News Letter, August 7, 1948

ANTHROPOLOGY

Guatemala's "New Look"

▶ NATIVE COSTUMES, long one of the chief tourist attractions in Guatemala, are taking on a "new look." Century-old styles gradually are being discarded in favor of clothes similar to those worn in the United States.

The old, authentic costumes are disappearing, bemoans Mrs. Lilly de Jongh Osborne, who has lived most of her life in Guatemala and possesses a superb collection of textiles.

The colorful native dress typical of each community is donned on religious holidays, important in the life of every Indian. But in most communities cheaper, machine-made blouses, skirts and trousers are worn the rest of the time.

Two factors are important in accounting for this change, Mrs. Osborne states. They are:

Easier communication. The natives travel everywhere and are familiar with clothes worn by the outside world.

Higher cost of living. It takes a woman four or five months to weave a good blouse, called a huipil, on the pre-Columbian looms still in use.

Most of the native costumes are made of cotton, which grows plentifully in Guatemala. Where in the past silk was used for

GUATEMALAN FASHIONS—Women of Santiago Atitlan are noted for their halo-like hair arrangement. A gaily colored ribbon many yards long is wound around their head to form a sort of crownless flat hat.

decoration, today rayon is employed. In the highlands where the mornings and nights are exceedingly cool, wool is used extensively.

In contrast to cotton, which for many centuries has been growing in the New World, sheep were brought to this country by the Spaniards. The proportion of black sheep is quite large as the Indians prefer to use this wool undyed for the heavy garments that the men use in many villages.

Guatemalan costumes are noted for their many bright colors, which nevertheless are never harsh. Those made for the Indian's personal use within the village often differ greatly from those which in recent years have been made for the tourist trade, but these also have a typical Guatemalan flavor. Aniline dyes, preferred by tourists, are beginning to replace the lovely vegetable dyes.

Women in their clothes today still retain a part of their old, traditional dress. Sometimes it is a hand-woven belt or huipil. Often it is reflected in the way their hair is dressed or the manner in which the skirt is worn.

Men's clothes have undergone a more radical change. Many have substituted factory-made overalls for their picturesque woolen aprons or long over-trousers split up the side.

But raincoats or umbrellas are still fashioned just as they were centuries ago. They are gathered from the woods rather than being purchased in a store. Broad palm leaves are easily sewn together into a cape-like affair offering perfect protection from the storm. Sometimes they are worn as a cape about the shoulders, sometimes they are thrown over the head—just how they are used depends upon the section from which the Indian comes.

Science News Letter, August 7, 1948

NUCLEAR PHYSICS

Atomic Power Timetable

➤ HERE'S a new timetable for atomic power:

Present power supply of world replaced in any considerable portion by nuclear fuel—20 years minimum, under favorable circumstances.

Fairly practical reactors, useful for special experimental purposes—within 10 years.

Two reactors especially built for power—within two or three years.

The Atomic Energy Commission in its latest report to Congress gives these estimates from an evaluation by its general advisory committee headed by Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, Princeton.

The possibility was suggested of producing atomic power plants that will actually increase the amount of fuel within them by breeding fissionable material from non-fissionable uranium and thorium. But the design of such power plants is recognized to be very difficult and slow.

Such production of artificial nuclear fuels is being practiced on a considerable scale at Hanford where plutonium for bombs is made from the inert part of natural uranium. Thorium, a much more common material, can be similarly converted into fissionable uranium 233.

The higher cost of uranium since the war, due to increased demand and higher mining costs of poorer and poorer deposits, seems likely to prevent atomic power from competing with coal power in the United States except where transportation costs of coal from mines is large or where the small bulk and weight of the uranium fuel are particularly valuable.

Science News Letter, August 7, 1948

ANTHROPOLOGY

Influencing Primitives

➤ WITCHCRAFT can be useful to modern scientists, when they are dealing with people who believe in witches.

This was discovered by Cornell University anthropologists who have made a study which might be called, "How to Win Friends and Influence Primitive Peoples."

A five-year program of study which began in Ithaca, N. Y., last October with the aid of a grant of $180,000 from the Carnegie Corporation of New York has resulted in a set of rules for teaching and doing business with primitive peoples. Research included studies of the impact of western civilization on primitive cultures, ranging from southeastern Asia to the American Southwest.

Dr. Morris E. Opler reported that he successfully demonstrated the theory of germ-borne diseases to a group of American Indians by tying it up with their own belief in witchcraft. If witches were able to plague their enemies with invisible things, Dr. Opler asked the Indians, wasn't it possible that disease might be transmitted in the same way—in a form too small for the eye to see? The Indians agreed and were persuaded to take precautions against disease.

When the U. S. Office of Indian Affairs attempted to stamp out the Indian custom of abandoning and burning the cabins of their dead, Dr. Opler persuaded some Indians that their old custom of fumigating "ghosts" with burning sagebrush might be used for fumigating the cabins.

As an example of the wrong approach, the Cornell scientist cited the story of an American scientist in India. The scientist, who was interested in raising the living conditions of Hindu villagers, tried to persuade them to grow vegetables in addition to their crops of rice and corn. The villagers laughed at him. He had failed to take into account the caste system which decrees that vegetable growers are a low and unworthy class, only slightly above the Untouchables. Farmers growing cereal grains rank near the top of the social scale.

Dr. Leonard S. Cottrell, Jr., head of Cornell's department of sociology and anthropology, said that the next four years of the research program will include special courses for American students seeking careers in missionary, agricultural and industrial fields overseas, courses for specialists who will measure the impact of western civilization on the backward areas of the world, and visits to research areas by anthropologists and research assistants.

Dr. Opler is gathering material on village life in the Ganges valley in India and plans to visit the area next year. Dr. R. Lauriston Sharp has recently left for Siam. Two other Cornell anthropologists, Dr. Alexander H. Leighton and Dr. John Adair, are establishing a field station in the Southwest in cooperation with the Office of Indian Affairs.

Science News Letter, August 7, 1948

ARCHAEOLOGY

Relics of Early Indians Found by Archaeologists

➤ POTTERY FRAGMENTS tempered with fiber, which apparently represent the birth of the ceramic industry among the Indians of the southeastern United States, have been uncovered by archaeologists from the Smithsonian Institution in Washington.

These broken pieces of pottery, which are an important archaeological find, were discovered when explorations along the Savannah river in Georgia and South Carolina revealed what must have been a popular Indian camp for perhaps a thousand years.

Indians, from the prehistoric mound-builders to the Creeks who lived in the area just before the coming of the white men, chose this site for a home and left behind them the traces of 150 habitation sites which are now being scientifically investigated for the first time. The Savannah river sites have been neglected by archaeologists until now, when parts of the area will be flooded in the construction of the Clark Hill Reservoir.

A survey of the region is being carried out as a cooperative project between the Smithsonian Institution, the National Park Service and the Army Corps of Engineers. Carl F. Miller and Joseph R. Caldwell of the Smithsonian staff are working to find and mark archaeological sites for possible future excavation before the reservoir is completed and flooded.

Science News Letter, August 7, 1948

PHYSICS

Weighing Spots Impurity

An electronic device speeds up the detection of impurities in metals from a matter of days by chemical methods to from five to 15 minutes.

▶ IMPURITIES in a metal, as little as one part in a million, are detected and weighed by an electronic device revealed by Westinghouse Research Laboratories. It does in from five to 15 minutes a job for which days are required by chemical methods.

The detector is an adaptation of what is known as a mass spectrometer, an electronic tube which sorts out materials in mixtures according to their atomic weight. William M. Hickam, Westinghouse physicist credited with its development, says it spots an impurity by weighing it. The telltale weight of its atoms gives it away.

A tiny but powerful furnace, an electron beam and a curved metal tube are the main elements of the device. In use, the instrument is set so that it records only the presence of an impurity with a specific atomic weight.

The furnace is used to vaporize a tiny sample of the metal of known weight. The atoms that boil off enter a cube-shaped enclosure where they are bombarded with electrons from the electron beam. This bombardment knocks off particles from the atoms and thus leaves them electrically charged. These are sent careening down the metal tube at a rate of a million feet a second. The tube is fixed between the poles of a powerful electromagnet.

As the atoms speed down the tube, the electromagnet "pulls" at them in such a way that only those having a certain mass, or weight, complete the path around the tube and pass through a tiny slit in a metal target at the end, Mr. Hickam explained.

The atoms passing through the slit are collected on a metal plate, where they give up their charges. The charges are amplified and counted by electric meters, which show how many atoms of a certain weight are present in the sample. The curvature of the tube is important. Atoms weighing less than those hitting the target are pulled to its inner lining before they can get around the bend, and heavier ones strike the outer wall of the tube as they try to make the curve.

Science News Letter, August 7, 1948

ELECTRONIC DETECTOR — Capable of ferreting out metal impurities weighing as little as one-tenth of a billionth of an ounce, the device is shown being prepared for action by William M. Hickam of the Westinghouse Research Laboratories, who is credited with its development.

CHEMISTRY

Synthetic Rubber Treads

▶ SYNTHETIC RUBBER for tire treads, soon to be available and claimed to increase wear more than 30% over the best natural rubber treads, will help make America independent of the natural imported product in case of another emergency. Synthetic rubber inner tubes, a wartime development, are now widely used and are generally acknowledged to be superior to the tubes of natural rubber.

These new treads have been announced by the United States Rubber Company. The key to their manufacture is the fact that they are produced at zero Fahrenheit temperature. Formerly Buna S (GR-S) rubber was made at a standard temperature of 122 degrees. Much research has been conducted in the United States to make the rubber at a lower temperature, in the conviction that a low-temperature product would be better.

The superiority of the new rubber is due to the fact that its molecules are more uniform than those in other rubbers, according to chemists of the University of Minnesota who developed a low-temperature process. The uniformity results from effecting the process of polymerization, a molecule changing action, at the lower temperatures, they said.

In making Buna S rubber, the standard ingredients are 70 parts butadiene, derived from either petroleum or alcohol, and 30 parts styrene, chiefly a coal derivative. When the mixture is put into a container, the top layer is made up of these two ingredients, while below is a layer of water containing a dissolved emulsifier such as soap and usually a dissolved catalyst, an activating chemical agent. In the Minnesota process an organic peroxide is used as a catalyst instead of the inorganic salts usually employed. When the mixture is stirred, polymerization takes place.

The quality of Buna S and similar rubbers seems to go up as the temperature of the mixture goes down, Prof. Carl Shipp Marvel, of the University of Illinois, recently explained. He described the so-called redox process in which the compounds are first emulsified with a soap, and the reaction started with a type of sugar. This method makes it possible to manufacture rubber at freezing or subfreezing temperatures.

Details of the process used by the United States Rubber Company in making its zero-temperature product are not announced. The rubber in the treads, however, contains furnace black, a carbon black made from natural gas or petroleum products in a furnace. The rubber developments were carried out in a plant at Borger, Texas, which the company operates for the federal government.

Science News Letter, August 7, 1948

ZOOLOGY

Baby Box Turtles Are Little Stinkers

▶ BABY TURTLES temporarily playing the role of skunks are the phenomena reported by Wilfred T. Neill, biologist at Augusta Junior College, Augusta, Ga.

They are the young of the common box turtle, the kind that has a hinge across the middle of the lower plate of its armor. While they are very small—less than one and one-half inches in shell length—this hinge does not work; and it is during this stage of their growth that they give off a powerful stench when disturbed.

Comments Mr. Neill: "The odors of these and other reptiles are usually considered to serve some protective function. It would be interesting to know whether or not this is true, and if true, how the odor protects, and from what enemies. It seems unlikely that many predators would be discouraged by a mere stench, as such."

Mr. Neill reports his observation in the scientific journal, *Copeia* (June 30).

Science News Letter, August 7, 1948

MEDICINE

Migraine Headache Relief Possible with Histamine

➤ RELIEF for migraine headache sufferers is possible with the body chemical believed involved in allergy, histamine, according to two Mayo Clinic physicians, Dorothy Macy, Jr., and Bayard T. Horton.

Their description of the treatment of 144 patients with migraine headache at this clinic from 1937 to 1946 appears in the *Journal of the American Medical Association* (July 24).

While 98 of these patients showed a 25% to 100% improvement, they emphasize that histamine is not a cure for the condition.

Drs. Macy and Horton stated that freedom from migraine attacks in these patients paralleled the period of treatment with histamine. They declared that patients who were free of symptoms after one year or more were still taking histamine once daily or every other day.

Science News Letter, August 7, 1948

DENTISTRY

Healthy Teeth Found Among Hydrofluoric Acid Workers

➤ MAKING HYDROFLUORIC ACID for the Manhattan atomic bomb project seems to have resulted in unusually healthy teeth for workers.

Men on the project who worked in an atmosphere laden with acid fumes had less than half as many dental fillings as did the office workers in the same plant who were not exposed to the fumes, Drs. Peter P. Dale and H. B. McCauley of the University of Rochester report in the *Journal of the American Dental Association*.

"This finding was made in spite of the fact that most of the men neglected their mouths," the doctors wrote.

It is known that fluorine in small amounts is very important to healthy teeth and recently dentists have begun to paint children's teeth with a solution of a fluorine compound to prevent cavities.

Science News Letter, August 7, 1948

CHEMISTRY

Compressed Gas Bubbles May Start an Explosion

➤ TINY GAS BUBBLES make an explosive more sensitive. These little pockets of gas when compressed become hot enough to start an explosion.

Friction on a small piece of grit may also be the factor which turns the relatively slow initial burning of an explosive into a real explosion. These findings were reported to the British journal, *Nature* (March 6) by the Research Group on the Physics and Chemistry of Rubbing Solids at Cambridge University.

Tracing the history of an explosion, the scientists found that liquid explosives which were set off by impact showed an initial slow burning which proceeded at the rate of about 890 miles per hour. Then, some sudden heating at a point in the explosive material caused the explosion to race ahead at a speed of about 4,000 miles per hour.

Solid materials showed a similar effect. The critical hot place in the material is believed to be due to either air or gas bubbles or grit.

Not all explosives show the two stages in the start of an explosion. One which was tested, lead azide, a solid, showed no initial slow burning but began exploding immediately.

Science News Letter, August 7, 1948

GENERAL SCIENCE

Visits to Chemical Work In Progress in Washington

➤ UNUSUAL OPPORTUNITIES to see the chemical work of the United States Government are being arranged for members of the American Chemical Society attending the 114th meeting of the society in Washington Aug. 30 to Sept. 2. Programs in nearly every field of chemistry are being carried on, ranging from creation of new compounds to testing and standardization of samples of those on the market.

Four major trips are offered chemists attending the meeting, scheduled in such a way that all four of the institutions may be visited by those who wish to, and still leave time for attending sessions in Washington. Beltsville, the research center and experimental farm of the Department of Agriculture, will appeal to many on account of the wide variety of researches there in fields touching the primary one of food supply. Visitors will see investigations of the effect of minor elements, fertilizer investigation, food and nutrition studies and insecticide work. The Naval Research Laboratory offers inspection of a number of chemical laboratories investigating protective coatings, fuels, lubricating agents and plastics, with special emphasis on its microchemical work and its under-water sound studies.

At the National Bureau of Standards, exhibits showing standards of fundamental measurements and pure materials, as well as investigations of rubber, textiles, paper, leather and plastics, and demonstrations of high voltage will be shown. In Bethesda, Md., visits will be made to the Naval Medical Center and to the U. S. Public Health Service's National Institutes of Health, where studies of immunology, blood fractions and cancer research will be seen.

These institutions, at a distance from the center of Washington, will be reached by special busses which are being arranged for at nominal fees to take members directly to the laboratories. So far as possible, these trips are scheduled in duplicate, on different days, to give a better chance for all visitors to go to all of them.

Science News Letter, August 7, 1948

IN SCIENCE

ASTRONOMY

Sundial Shows Midnight And Midday at Thule

➤ MIDNIGHT as well as midday is indicated these summer months by a sundial in Thule, situated on the northwestern coast of Greenland.

Thule, only 800 nautical miles from the north geographic pole, is so far north that the sun is above the horizon continuously for three months. It remains above the horizon for a while each day for another five months.

The angle on the shadow-forming upright or gnomon of this, probably the world's northernmost sundial, is exceedingly steep. The geographical coordinates of Thule are 76 degrees 33½ minutes north, 68 degrees 48 minutes west. Thus the upright has an angle of about 76½ degrees, Lt. Howard P. Smith, Jr., amateur astronomer stationed at Randolph Field, Tex., reports in *Sky and Telescope* (June).

The standard time in Thule, one of the world's most northerly permanent settlements, is four hours less than Greenwich time. The sundial is set within ten minutes of local meridian time.

Science News Letter, August 7, 1948

GENERAL SCIENCE

American-Soviet Science Group Ceases Activities

➤ LACK OF FUNDS, due to failure of the U. S. Treasury Department to grant tax-exempt status, has caused the American-Soviet Science Society to cease activities.

In 1946 the society was offered a grant of $25,000 from the Rockefeller Foundation for the continuance of its work of acquainting American scientists with the work of Soviet scientists and furthering better relations between the scientists of the U. S. A. and the U. S. S. R.

According to a statement issued by the society's executive committee, the Treasury Department failed to act on the application for tax exemption because the House Un-American Activities Committee is investigating Dr. Edward U. Condon, director of the National Bureau of Standards, who is one of the members of the executive committee.

Since tax-exempt status was necessary to accept the Rockefeller grant, the society has suspended its bulletins since September, 1946.

A collection of Russian scientific and technical books and journals has been deposited by the society with the American Russian Institute in New York.

Science News Letter, August 7, 1948

NCE FIELDS

ASTRONOMY

New Object in Heavens Discovered by Wirtanen

➤ ANOTHER new object has been discovered in the heavens by C. A. Wirtanen of Lick Observatory of the University of California.

Found in the constellation of Pegasus, the winged horse, Dr. Charles D. Shane, Lick's director, states that it is of the 13th magnitude and thus far too faint to be seen without a good telescope.

Instead of being another comet, the object is probably an asteroid moving unusually rapidly across the heavens. Located on plates taken on July 21, it was headed northwest, according to reports received at Harvard College Observatory, clearing house for such astronomical information in the Western hemisphere.

This is the second faint object Mr. Wirtanen discovered in July. On July 15 he reported finding a 15th magnitude comet, located in the near-by constellation of Equuleus, the colt, and headed toward the constellation of Aquila, the eagle.

Early in the morning of July 21, the object's right ascension was 21 hours, 7.8 minutes; its declination plus 12 degrees, 27 minutes. Its daily motion in right ascension is minus 22 seconds, in declination one degree, 28 minutes.

Science News Letter, August 7, 1948

ZOOLOGY

Rattlesnakes Tattooed To Trace Their Movements

➤ TATTOOING RATTLESNAKES, a pastime of Prof. Angus M. Woodbury, is a feat in which he is not likely to be widely imitated. He does it for scientific reasons, marking the snakes with numbers so that they can be identified if picked up subsequently, and their movements thus traced. In the past ten years he has tattooed 777 rattlesnakes and 529 non-poisonous snakes.

The job is done with a home-made outfit consisting of six fine needle points mounted on a piece of piano wire, vibrating within the outer casing of a mechanical pencil. A switch on the outside of the casing controls the vibrator, which was adapted from the "works" of a doorbell. Eight dry cell batteries furnish the power.

It is necessary for the needle points to punch clear through the tough skin, and even the scales, so as to leave some of the India ink in the tissues underneath. Otherwise the markings would be lost the next time the snake shed its skin.

Rattlesnakes are tattooed on the underside of the body just back of the head, Prof. Woodbury states; non-poisonous snakes receive their identification marks farther aft. The snake is held by an assistant during the tattooing operation; or if he is alone, Prof. Woodbury holds the reptile down with his foot. What the snake says, he does not report.

Prof. Woodbury gives details of his technique in the zoological journal, *Copeia* (June 30). He thinks it can be adapted for use on other lower animal forms such as lizards, amphibians and fish.

Science News Letter, August 7, 1948

PHYSIOLOGY

Crowing Hens Point Way to Useful Gland Discoveries

➤ CROWING HENS, which in older times were regarded with horror as a kind of evil miracle, have indirectly accomplished much good in pointing the way to many useful discoveries in the glandular physiology of chickens and other animals, it was pointed out in a talk given jointly by Dr. Mary Juhn of the University of Maryland and Dr. Richard Fraps of the U. S. Department of Agriculture.

Dr. Juhn and Dr. Fraps spoke as guests of Watson Davis, director of Science Service, on Adventures in Science, sent out over the network of the Columbia Broadcasting System.

Hens crow and in other ways behave like roosters because of disease or other abnormalities in their female glandular system, Dr. Juhn pointed out. Discovery of this fact, years ago, led to much research on the activities of the ductless glands and the effects of their secretions, the hormones.

In one of her own experiments on the influence of hormones on feather growth, Dr. Juhn injected female sex hormone daily into young roosters, while their feathers were growing. Hen-like feathers sprouted. However, she gave the roosters (and herself) a rest on Sundays—and each of these interruptions in the hormone treatment produced a male-pattern cross-bar on the otherwise hen-like feathers.

Dr. Fraps told of his recent discovery in chickens of a hormone known as progesterone, hitherto considered a monopoly of mammals. (See SNL, July 31.) In the latter animal group, progesterone brings about the attachment of the early-stage embryo to the maternal tissues that nourish it and bring it to birth. Its role in birds is anything but clear as yet, but Dr. Fraps thinks it may have indirect effects on egg development and possibly on the presence of a germ-repelling substance in the egg white that protects the growing chick in the shell.

Of course, the presence of this "mammalian" hormone in birds is of great interest to students of evolution, as adding a new bit of evidence of descent of these two widely different groups from a common ancestor.

Science News Letter, August 7, 1948

RADIO-ENGINEERING

Radio Signals Sent from Rocket at 72-Mile Height

➤ A WAR-DEVELOPED DEVICE, for sending automatic radio signals giving scientific information from a roaring rocket high above the earth, operated successfully at the White Sands Proving Grounds, Las Cruces, N. Mex., in a test just revealed, from an altitude of nearly 72 miles while traveling at over 2,800 miles an hour.

The device that provides scientific data from aloft to ground-based recording instruments is known as a telemeter. In this test what is known as the Aerobee telemetering system was used. It has had many successful trials, but this is the first time that this miniature telemetering system has reached an altitude of 71.78 miles above the earth and attained a maximum velocity of 2,830 miles an hour.

The information collected and sent to the ground-based recording instruments include flight characteristics, motor performance and missile aspect, data on cosmic ray intensity, the quality of sunlight above the atmospheric blanket, and changes in the earth's magnetic field. The system has been used to transmit 24 different kinds of information. The records sent are continuous.

The system used in this test was evolved during the war by scientists of Princeton University and of the Applied Physics Laboratory of Johns Hopkins University at Silver Spring, Md. The application to supersonic missiles, those that travel faster than sound, was made at the Applied Physics Laboratory.

Science News Letter, August 7, 1948

WILDLIFE

Western Tourists See New Wildlife Park

➤ VACATION travellers now have an opportunity to see a sample of primitive western American wildlife in its natural environment, with the opening of the new 1,500-acre Jackson Hole Wildlife Park in Wyoming, south of Yellowstone National Park. A fence, so arranged as to be practically invisible, surrounds 400 acres of the area, keeping elk, bison, moose, deer and pronghorn within easy sight of the automobile road. Horseback trails make more of the wilderness accessible to those who wish to stay longer.

This newest wildlife park has been set up on land made available by John D. Rockefeller, Jr., and his son Laurance S. Rockefeller. The Wyoming Game and Fish Commission, the Jackson Hole Preserve, Inc., and the New York Zoological Society are cooperating in its development.

Although the new park is open to tourists only during the normal season for easy travel, it will be used by research zoologists on a year-round basis for the study of the ways of wild animals.

Science News Letter, August 7, 1948

PSYCHIATRY

Psychiatry Comes of Age

By an act of Congress money has been appropriated which is being spent on research, training, treatment, public education and prevention of mental ills.

By DR. ROBERT H. FELIX

Chief, Mental Hygiene Division, U. S. Public Health Service

Written exclusively for Science Service

➤ A RELATIVELY NEW kind of medical science today is lending a skilled hand to thousands of Americans battling problems that seem too big for a man to fight alone. The new science seems till now to have slept in a cloud-capped tower ever since its birth more than a half century ago.

This awakening science is psychiatry. You have heard a lot about it. You've seen stories and pictures that ran in newspapers and magazines not long ago about the terrible bedlams in which some American mental patients are kept. You've seen beautiful, but troubled, ladies in movies who were straightened out in six reels by a handsome brain doctor with a silky voice and a hypodermic needle.

Insanity Fraction of Problem

Chances are, however, you have always thought of insanity as something that happened to somebody else. You were partly right. Actual insanity, according to the best psychiatrists, is only a tiny fraction of the problem psychiatry is setting out to lick. It touches only a few Americans—less than three-quarters of a million of us are in the mental hospitals. There are at least 8,000,000 who suffer some form of mental sickness, however, and it is estimated there are another 10,000,000 now living who will spend some part of their lives in a mental hospital.

Pick up your daily newspaper. Read the headlines: "Torture suspect confesses"; "Mother stabs infant to death"; "Unwed mother attempts leap—prefers death to life without lover."

A Harvard University sociologist predicts that by 1957 the number of divorces will equal the number of marriages. Alcoholism, sex atrocities, and bobby-sox criminals alarm parents everywhere.

These tragedies are symptoms—symptoms of human, personal crises that burst forth suddenly like flames from a smoldering rag pile. They are symptoms of a kind of sickness traditional medicine has hardly touched. It is a sickness of the mind, not the body. It is by no means always violent; more often it rests in quiet desperation, in cumulated failures, frustration and worry. Often it leads simply to unhappy, fruitless lives. Sometimes to divorce, alcoholism or crime. Sometimes the path ends in the mental hospital.

Yet the happy truth is that in the early phases most of this tragedy can be prevented by the kind of expert counsel psychiatry is prepared to give now. Hundreds of thousands of Americans who are on the brink of mental or emotional disaster can be guided toward self-salvation by the mental health clinics the States are now organizing with funds provided by the Federal Government.

For the first time in history, a nation is attempting to bring the benefits of the new science psychiatry to its whole people. Stirred by the frightening number of young men and women whom the Selective Service, the Army and the Navy had to reject because of mental or emotional upsets, Congress passed the National Mental Health Act, appropriating $4,500,000 for the first year's program, and placing that program with the U. S. Public Health Service.

The Public Health Service's attack on mental illness which began in July of 1947 with the $4,500,000 is almost identical in technique with the Federal attack on cancer which began ten years ago. It was outlined by a council chosen from the best psychiatric brains in this country, the National Advisory Mental Health Council. Under this outline, Federal money, supplemented in some instances by State funds, is being spent on research, training, treatment, public education and prevention.

Research Grants

So far research grants have been made to more than 30 universities, hospitals and other institutions as well as to individuals in order to study the causes, treatment and prevention of mental illness. More than 20 fellowships for research have been financed. Research will be carefully planned and coordinated, as was done with cancer, so that an organized, interconnected body of knowledge will begin to grow with a minimum of duplication.

Grants have also been made to medical schools and other institutions to train urgently needed personnel—psychiatrists, clinical psychologists, psychiatric social workers and psychiatric nurses. It is expected that eventually occupational and recreational therapists and other mental health personnel will receive training under the program.

Of most concern to the public, however, is the plan to bring mental health facilities to as many U. S. neighborhoods as possible. This is the vital preventive phase of the program, and over half the total appropriation will be spent here. By the first of the year more than 40 States have had their plans approved. In many States the plans are well under way.

One of the stiffest battles the Public Health Service and the States will have to fight will be to persuade the average U. S. citizen to bring his mental and emotional problems to a psychiatrist, just as he takes his broken limbs to a general practitioner.

What the public was not told when the stories about the mental hospitals were running, is that only about 10% of the mentally disturbed persons in this country are ill enough to be in hospitals.

Preventive Treatment

Like the submerged bulk of an iceberg, the six or seven million Americans the Public Health Service estimates need some degree of mental or emotional guidance are not seen, either by practicing psychiatrists or the hospitals. It is these six or seven millions in the rural areas as well as the towns and big cities that the clinics must eventually reach with preventive treatment. These are the unhappy mortals who are sick of their jobs, sick of their families and friends, sick of their very lives. These are the Walter Mittys, the little frustrated people whose daily paths are concentric circles. And they are the ones whom psychiatry can promise very real help. It can

NATION-WIDE PROGRAM—Under the direction of Dr. Robert H. Felix, a program for community mental health clinics has been started by the U. S. Public Health Service.

LOOK-OUT FOR MENTAL AILMENTS—Mental disorders can be spotted early. The little girl is depicting one symptom as she becomes upset when the arithmetic problem will not come out right.

do a lot, given enough staff, funds, equipment, and the like.

The experience of the Army and the Navy during World War II proved beyond any question that the pre-psychotic—the man on the road toward mental illness—can be restored to useful life.

When Dr. William Menninger, one of this country's outstanding psychiatrists, testified before a Senate subcommittee on the National Mental Health Act, he underlined one fact: "Most significant of the entire (Army) experience was the predominance of minor psychiatric problems, which . . . constituted 80% of the problems of diagnosis and treatment. One can only assume that this experience is applicable to civilian life."

Dr. Menninger was quite right. It does apply to civilian life. But good treatment, given early, will nearly always cure the early cases. Here is the crux of the whole problem: find the half-sick seven millions, destroy their fear of mental treatment, then treat them.

Long ago people were ashamed to admit they had tuberculosis; more recently, they were afraid to go to public clinics for treatment of venereal disease. Today they are even more afraid to be found in a psychiatrist's office, or, worse, a mental hospital. Persons known to be getting mental treatment have lost their jobs, their friends. "So-and-so is going to a psychiatrist—he must be nuts," is too often the popular verdict.

For this reason, the Public Health Service hopes that mental health clinics will be made physically a part of general health clinics or hospitals so that visits to a psychiatrist will come to be considered as no different than visits to a pediatrician, let's say, or a gynecologist.

By no means does everyone with problems too big for him need a psychiatrist, and of course there are not enough psychiatrists to see everyone who needs mental and emotional guidance. It is here that the general practitioner fits into the program.

Training Personnel

During this fiscal year, over $1,000,000 will be spent on training the several types of personnel who make up a mental health clinic—psychiatrists, clinical psychologists, psychiatric social workers, and psychiatric nurses. But a large part of the training program will cover medical students, many of whom now learn little about psychiatry during a whole four years in medical school.

With good training in psychiatry behind him, plus some internship in a mental hospital or clinic, the general practitioner could become the bulwark of a psychiatric program. There will always be more of him than of psychiatrists, and no one hesitates to bring their problems to the family doctor.

Before any large number of medical students can get the needed training in psychiatry, however, the public mental health clinics will have been functioning for some time. Where will they get their patients? How will they actually reach the public, and how can the public be persuaded to use them? The answers to these questions will decide the most vital point in the whole mental health program. Can psychiatry be carried to the public-at-large?

The Public Health Service hopes that the ice will be broken by having patients referred from private physicians, from the schools, Community Chest agencies, courts and welfare organizations. The public health nurse is a tremendous case-finding tool. She sees everyone except the rich. She can be very helpful in referring to the clinic children and grown-ups in need of mental and emotional guidance.

Gradually, the public will learn that good psychiatry is by no means frightening to the patient, nor anything to be ashamed of seeking. It is by no means always the half-hopeless struggle against the dark mystery of schizophrenia, and its techniques are by no means limited to the "shock" treatments, "truth drugs," or other violent or dramatic treatments. Usually, it is nothing more than skillful questioning—and listening—by the psychiatrist. The gradual persuasion of a patient to understand and help himself. A patient's good points are skillfully balanced against his weaknesses—he is slowly given insight into his problems.

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Some 19,500 persons were killed in America during 1947 in *farm accidents.*

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The *tropical papaya,* which produces an edible fruit resembling a cantaloup, looks somewhat like a palm tree but it is not related to the palm.

The *stripes* that make the zebra and the tiger so conspicuous in the zoo make them hard to see in their natural habitats; they are one of nature's best examples of camouflage.

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Psychiatrists, the Public Health Service believes, will one day be accepted by the public as readily as surgeons or dentists. They are very truly human beings. Sometimes they need to visit other psychiatrists. There is a story about a Washington, D. C., psychiatrist who walked into an elevator shaft in an apartment building where he had lived 30 years. He had always thought it was a closet! !

Science News Letter, August 7, 1948

MEDICINE

Warn Ex-Syphilitic Vets

➤ A WARNING is being issued to veterans who were treated in service for syphilis with penicillin that they need periodic check-ups because there is a possibility that between 20% and 30% of these cases were failures, officials of the Veterans Administration stated.

The old Army treatment for the disease with arsenic and bismuth was time-tested and results were therefore predictable. The disadvantage in this 26-week treatment was that one out of every 30,000 was killed while penicillin has proved superior without killing any patients. However, penicillin treatment is still in an early stage. It will require about 20 years study and follow-up to determine the effect on the patient.

Meanwhile, Uncle Sam is worried about the boys who received treatment and thought themselves cured because in many cases the patient received either inadequate treatment, because of discharge did not get the necessary blood and spinal fluid tests required for a year after treatment or was discharged before he got an examination of his spinal fluid.

Syphilis, if not treated, or inadequately treated, may attack the heart and nervous system and therefore in many cases leads to insanity. Officials estimate that each case of insanity in a veteran costs the taxpayer $40,000 from the time the patient is admitted to a hospital until his discharge.

They estimate that approximately 400,000 veterans were treated while in service in the armed forces. About 52,000 veterans were treated in 1946 following their discharge but there is no way of telling what proportion were infected after they got out and which of them were relapse cases. No one has followed army cases long enough although an attempt will be made to do this in the future.

The officials of the Veterans Administration cautioned that without preventive action now, syphilis in veterans will cost the taxpayer around one billion dollars in the course of the next 25 years.

Science News Letter, August 7, 1948

MEDICINE

Mix Vaccine-Toxoid Shots

➤ CHILDREN will get better protection against diphtheria and whooping cough when the materials used for the anti-diphtheria and anti-whooping cough shots are combined in one mixture instead of being given separately.

Studies showing this are reported by Dr. Joseph A. Bell of the U. S. Public Health Service in a report to the *Journal of the American Medical Association* (July 17). The studies were made in Norfolk, Va., and neighboring territory, beginning in 1941.

Children from the ages of two to 23 months were selected for the test and divided at random into two groups. One group was given an alum-treated mixture of whooping cough vaccine and diphtheria toxoid. They got two shots of this, four weeks apart.

The other group got whooping cough vaccine and diphtheria toxoid in separate injections.

Of 407 children who got two doses of the mixed product, 48 got whooping cough. Among the 385 who got two doses of the vaccine alone, 158 cases of whooping cough occurred.

A year after receiving the first injection, 992 children in the diphtheria study were given Schick tests, the standard method of determining immunity to diphtheria. A positive reaction to this test shows susceptibility to diphtheria. There were only one-third as many positive reactions in children who got the mixed product as in those who received unmixed toxoid.

The mixed vaccine-toxoid shots are effective in babies as young as two to five months old and side reactions, Dr. Bell reports, are "few and negligible." But at least one of the doses, he advises, should be given after a child is six months old for best protection.

Science News Letter, August 7, 1948

PUBLIC HEALTH

Smallpox Disappearing in Nation, Figures Show

➤ SMALLPOX has almost disappeared in the United States. The number of reported cases dropped 50% from 1946 to 1947 and 98% in the last decade, a survey by the Metropolitan Life Insurance Company shows.

During the first 20 weeks of this year only 45 cases of this dangerous disease have been reported. This is about one-third the corresponding figure of a year ago.

Science News Letter, August 7, 1948

CHEMISTRY

See How Atoms Tie Up

Neutron beam technique permits the photographing of the pattern produced by a stream of neutrons when they scattered by passing through an ice-crystal.

➤ FOR THE FIRST TIME scientists have actually been able to see how hydrogen atoms tie up to the oxygen atoms in a piece of ice.

Drs. E. O. Wollan, C. G. Shull and W. L. Davidson of the Oak Ridge National Laboratory in Oak Ridge, Tenn., have found that hydrogen atoms are not stay-at-homes, fixed in one position, as proposed by some scientists. Instead, the hydrogen atoms are restlessly jumping from one position to another in the crystal structure of ice.

A method of locating the tiny hydrogen atom in a crystal was described by Drs. Wollan and Shull at the International Congress of Crystallography at Harvard University. Since hydrogen is present in all of our foods, fuel, clothing, and many other materials, such studies are of great potential importance.

The Oak Ridge scientists photographed the pattern produced by a stream of neutrons, the particles which trigger an atomic bomb, when they have been scattered by passing through an ice-crystal. The pattern is like a shadow picture of the atomic structure of the crystal. It can give scientists a great deal of information about the internal make-up of the material through which the neutrons have just passed. A wide variety of other substances in addition to ice have been studied by the neutron beam technique.

Many times in the past the patterns formed by streams of electrons and X-rays have been photographed but neutrons act very differently and their patterns give a new view of crystal structure.

Production of diffraction patterns with neutrons is much more difficult than getting the patterns with electrons and X-rays. Only recently has this feat been accomplished with neutrons from the chain-reacting pile at Oak Ridge.

Science News Letter, August 7, 1948

CHEMISTRY

Dyes Close to Explosives

➤ REPORTS from Ludwigshafen, Germany, that the destructive explosions, which wrecked the chemical plant of the I. G. Farben works, came from the methyl violet factory serve to remind the world of the close connection between dyes and explosives. They are made from the same coal-tar chemicals. One of the reasons for Germany's great development of the coal-tar dye industry before World War I was her interest in developing the explosives industry at the same time.

The dual nature of the element nitrogen, at once the safest and the most dangerous of the common elements on which life depends, is responsible for this latest chemical disaster, as it was in the case of the ammonium nitrate explosions at Texas City last year and at Oppau, Germany, some 20 years earlier. The present explosion, however, was not due to ammonium nitrate, a supposedly safe material. Methyl violet, the dye chemical reported to be the cause of the Ludwigshafen explosion, belongs to a class of compounds known to be chemically unstable. Methyl violet belongs to the class of triphenyl methane dyes in which three nitrogen atoms are combined in each molecule with a quantity of carbon and hydrogen. It is a distant relative of the explosive T. N. T. In any such compound, given the right conditions, the normally mild and inert nitrogen may suddenly change partners and the result may be an explosion.

The true chemical explosion occurs when an unstable substance changes into a more stable one, giving off heat as it does so. The products are usually gases, and the heat given off by the explosion puffs them out into a larger volume, wrecking anything solid that may be in the way. In the accounts from Ludwigshafen, one explosion after another seemed to have been set off in this way, so that the result was a sort of "chain reaction." After such a conflagration is once started, the intense heat may continue to make materials not normally explosive vaporize suddenly with results as disastrous as those of the deadliest nitrogen compounds. There is a report that rocket fuels, with their high oxygen content, were among the products of this plant. If so, these would add to the fierceness of the flames.

Science News Letter, August 7, 1948

CHEMISTRY

Selenium Produced in New Fibrous "Wool" Form

➤ THE "MOON ELEMENT," selenium, used in electric current rectifiers and photocells, is produced in a new fibrous form similar to glass wool by a process on which an English inventor, D. L. A. Driver of London, has been granted patent 2,445,768. The molten selenium is sprayed through a series of nozzles into a chamber, where it forms a felted mat of "wool" on a moving belt. This mat can be rolled for storage, or immediately cut into disks for use in rectifiers or photocells. Rights in the patent are assigned to Standard Telephone and Cables, Ltd.

Science News Letter, August 7, 1948

Science Service Radio

➤ LISTEN in to a discussion on mental health for the world on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p. m. EDST Saturday, Aug. 14. Watson Davis, director of Science Service, will have as his guests two of the leaders of the International Congress on Mental Health, to be held in London Aug. 11 to 21. They are Dr. John R. Rees of London, President of the International Committee for Mental Hygiene and organizing chairman of the congress, and Dr. Lawrence K. Frank of Ashland, N. H., Chairman of the International Preparatory Commission.

Science News Letter, August 7, 1948

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PHYSICS

Fifth Dimension Invented

➤ A FIVE-DIMENSIONAL WORLD, in which space and time have been broken up into chunks so small that they cannot be divided any further, has been invented by a British mathematician.

This new geometry adds a new "uncertainty dimension" to length, breadth, thickness and time. It is described by Prof. H. T. Flint, of the University of London, as necessary to take account of that paradoxical offspring of quantum mechanics, the "uncertainty principle," in explaining the behavior of subatomic particles.

"There have been indications during the past 20 years," Prof. Flint reports to the American Physical Society in *Physical Review* (July 15), "that existing physical theories break down when applied to the microscopic phenomena of physics."

In the subatomic world, distances below a certain definite length have no physical meaning. Prof. Flint therefore suggests a geometry based on these smallest units of length.

The result is a mathematical system which adds one more dimension to the four space-time coordinates of the Einstein theory of relativity. This new dimension expresses the strange fact, long accepted by atomic physicists, that a particle such as an electron cannot be exactly located or "pinned down," but measurement of its position involves a definite uncertainty. Scientists can say for sure that the electron is somewhere within a given region, but they can't say exactly where. The amount of uncertainty is closely related to the mass of the particle.

Since space and time are tied together by the theory of relativity, an error in locating the particle in space also means an error in locating it in time. Both these "necessary errors" can be calculated by five-dimensional mathematics. Although no new physical principle is involved in the world of five dimensions, a neater mathematical technique is suggested for describing the behavior of the smallest particles in the universe.

Over 2,000 years ago Euclid invented the first geometry, using only two dimensions, and describing only figures that can be drawn on a flat surface. Until 42 years ago mathematicians were certain that space had only three dimensions, but at that time Einstein first presented to the world his revolutionary space-time continuum, with time as the fourth dimension. Now it appears that non-mathematicians, already groggy from trying to comprehend the fourth dimension, will have to assimilate a fifth.

Science News Letter, August 7, 1948

ENTOMOLOGY

Mosquitoes Survive Cold

➤ MOSQUITO-BITTEN mortals who console themselves with the thought that the first cold weather will be the death of all these pests are being cruelly deceived: not all of their blood-thirsty tormentors will die. Some are likely to survive in sheltered spots, and in the spring will lay their eggs to produce another pestiferous generation.

Egg-laden female mosquitoes can survive a surprising degree of cold, states Charles O. Masters of Cleveland, a graduate student who is making a special investigation of the ecology of mosquitoes.

In one forested area which he has under observation there is a long culvert, seven feet in diameter. Into this he has made weekly trips through two winters, walking 200 feet or more into the darkness and observing, by means of a flashlight, hundreds of mosquitoes clinging to the walls, mostly overhead.

As the weather becomes colder more and more of them lose their hold and drop into the water flowing along the bottom. Practically all of these are washed outside and so perish. Some, however, fall on dry ground and remain there until warmer weather "unstiffens" them and permits them to crawl up the wall again.

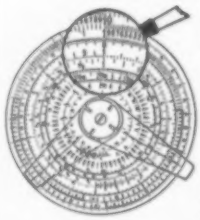
Spiderwebs, paradoxically enough, are the salvation of a few insects. They fall upon old webs, and when they revive they escape and crawl to safety.

The severe winter of 1947-48 was much harder on the mosquito population of the culvert than was the milder winter of 1946-47, Mr. Masters states. As night temperatures dropped to 10 or 15 degrees Fahrenheit throughout most of January, the insects were still able to hold on; but a sudden drop to five degrees below zero wiped out almost the entire population. An hour's search in the culvert turned up only one mosquito, and that a member of a malaria-bearing Anopheles species, still clinging to the wall.

Mr. Masters carried home 24 mosquitoes of another and more abundant species which he found lying numbed above the water-line. Most of them revived when taken indoors.

Science News Letter, August 7, 1948

THE BINARY SLIDE RULE



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BIOCHEMISTRY

X-Raying Mold Boosts Production of Penicillin

➤ PENICILLIN PRODUCTION can be greatly increased through treatment of the molds that produce it with X-rays. This is disclosed in newly-issued U. S. patent 2,445,748, taken out by Dr. M. Demerec, head of the genetics department of the Carnegie Institution of Washington, whose laboratory is at Cold Spring Harbor, N. Y.

X-ray doses of from 50,000 to 150,000 roentgen units are applied to mold spores. Most of them are killed, but among the survivors are newly induced, mutated strains which produce larger "crops" of penicillin than those currently in use. The same technique can be applied to other molds producing other compounds, states Dr. Demerec, and if desired atomic fission radiations and even cosmic rays may be employed instead of X-rays.

Since Dr. Demerec's discovery was made in the course of federally supported wartime research, the patent is assigned to the government.

Science News Letter, August 7, 1948

CHEMISTRY

Advanced German Method For Oxygen Determination

➤ AN ADVANCED METHOD for the direct determination of oxygen in a compound, developed and widely used in Germany, is reported by British investigators and is now available to American technicians.

In this method the compound is decomposed in a stream of nitrogen, and the products passed over heated charcoal. The oxygen is thus converted to carbon monoxide which is then passed into iodine pentoxide. The determination is completed either by weighing the carbon dioxide produced after absorption in Ascarite, a sodium hydroxide-asbestos preparation particularly developed for carbon monoxide absorption, or by titration of the liberated iodine.

A report of the complete method, together with other German developments of interest in the field of organic microchemistry, is available from the Office of Technical Services, U. S. Department of Commerce, for $7.50 in photostat form, or $2.75 in microfilm form.

Science News Letter, August 7, 1948

Books of the Week

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AMERICAN SEXUAL BEHAVIOR AND THE KINSEY REPORT—Morris L. Ernst and David Loth—*Bantam,* 174 p., paper, 25 cents. Reprint of a book originally published by the Greystone Press. A lawyer and a biographer give some of the applications and implications they believe will result from the Kinsey report.

BATTLEFRONTS OF INDUSTRY: Westinghouse in World War II—David O. Woodbury—*Wiley,* 342 p., illus., $3.50. The absorbing story of the contributions of a big industry and research organization varying from gun mounts to atomic fission, bug bombs to airplane launchers.

CAMERA & LENS: Studio, Darkroom, Equipment —Ansel Adams—*Morgan and Lester,* 120 p., illus., $3.00. An important book for professional or amateur photographer as well as anyone planning to buy photographic equipment. Beautifully illustrated with the author's photographs.

CHART OF THE ISOTOPES—G. Friedlander and M. L. Perlman—*General Electric Company,* 26 x 50 inches, paper, free upon request to the General Electric Company, Schenectady 5, New York. Containing information about the known isotopes and with plenty of empty spaces for keeping the chart up to date.

COLLEGE PHYSICS—Henry A. Perkins—*Prentice-Hall,* 3d ed., 786 p., illus., $6.65. Revised to include radar, atomic physics and other new developments.

COMMERCIAL FLOWER FORCING: The Fundamentals and Their Practical Application to the Culture of Greenhouse Crops—Alex Laurie and D. C. Kiplinger—*Blakiston,* 5th ed., 550 p., illus., $4.75. Revised to include newest practices and labor-saving devices.

EARLY TALES OF THE ATOMIC AGE—Daniel Lang—*Doubleday,* 223 p., $2.75. Engrossing and intimate stories that take you behind the scenes in the production of an atomic bomb. They originally appeared in slightly different form in the *New Yorker.*

FEEDING THE HUMAN FAMILY: Science Plans for the World Larder—F. Le Gros Clark—*Sigma,* 125 p., illus., $2.35 approx. A book written in the food-importing country, England, with full realization of the seriousness of the world-wide problem.

THE GOODNOW MOUND, HIGHLANDS COUNTY, FLORIDA: Containing a Report on the Skipper Site, Highlands County—John W. Griffin and Hale G. Smith—*Florida Board of Forestry and Parks,* 36 p., illus., paper, free upon request to the Florida Board of Forestry and Parks, Tallahassee, Fla.

GRASS: The Yearbook of Agriculture, 1948—*Govt. Printing Office,* 892 p., illus., $2.00. Here's a book for: The suburbanite trying to make his front yard green; the cattleman interested in range management; the conservationist who wants to save America's soil; the botanist concerned with plant identification or breeding.

IDENTIFICATION OF TUMORS: Essential Gross and Microscopic Pathologic Features Systematically Arranged for Easier Identification—N. Chandler Foot—*Lippincott,* 397 p., illus., $6.00. Intended as a brief guide and aid to differential diagnosis.

INTERNATIONAL CONTROL OF ATOMIC ENERGY—POLICY AT THE CROSSROADS: An Informal Summary Record of the Policy Developments Concerning the International Control of Atomic Energy, October 15, 1946 to May 17, 1948—Department of State—*Govt. Printing Office,* 251 p., paper, 45 cents. Basic "paper" and record on the attempt to secure international control through the United Nations special commission and background to the forthcoming General Assembly discussion at Paris.

LONCHOCARPUS, DERRIS, AND PYRETHRUM CULTIVATION AND SOURCES OF SUPPLY—E. C. Higbee—*Govt. Printing Office,* 36 p., illus., paper, 15 cents.

THE MACHINERY OF THE BODY—Anton J. Carlson and Victor Johnson—*University of Chicago Press,* 3d ed., 639 p., illus., $4.50. A well known text, revised to include the more significant of the advances during World War II.

MAP OF THE WORLD—*American Geographical Society,* paper, $2.50. Height above sea level is shown by the colors, marshes and other topographic features by symbols, and great circle distances by a chart printed on the back. A clear, useful map for wall use.

MINE OWN EXECUTIONER—Nigel Balchin—*New American Library,* 190 p., paper, 25 cents. A novel originally published by Houghton Mifflin and later made into a movie, this book gives an understanding of the personality of a schizoid individual and also some of the problems of the practicing psychiatrist.

THE OUTLOOK FOR WOMEN IN MATHEMATICS AND STATISTICS — Women's Bureau — *Govt. Printing Office,* 21 p., illus., paper, 10 cents. Describing vocational opportunities.

THE OUTLOOK FOR WOMEN IN PHYSICS AND ASTRONOMY—Women's Bureau—*Govt. Printing Office,* 32 p., illus., paper, 15 cents. Vocational opportunities in two fields of science.

ROAD TO SURVIVAL — William Vogt — *William Sloane Associates,* 335 p., illus., $4.00. A dramatic setting forth of the whole world's great dilemma, that of rapidly diminishing natural resources and of rapidly increasing numbers of mouths to feed and hearts to suffer. The author, conservation expert of the Pan-American Union, points out what he sees as the only "road to survival."

SCIENTIFIC RUSSIAN READER: Selected Modern Readings in Chemistry and Physics—Noah D. Gershevsky—*Pitman,* 253 p., $3.50. For students who have already studied from 20 to 30 hours of Russian.

SOIL MECHANICS IN ENGINEERING PRACTICE—Karl Terzaghi and Ralph B. Peck—*Wiley,* 566 p., illus., $5.50. For engineers and others concerned with the properties and behavior of soil.

STABLE ISOTOPES—*Atomic Energy Commission,* 8 p., paper, free on request from U. S. Atomic Energy Commission, Isotopes Division, P. O. Box E, Oak Ridge, Tenn. A description together with information as to where they are available.

WEATHER ELEMENTS: A Text in Elementary Meteorology — Thomas A. Blair — *Prentice-Hall,* 3d ed., 373 p., illus., $5.65. With new chapters on the characteristics of air masses and fronts and the relation of weather to aviation.

Science News Letter, August 7, 1948

Three different kinds of *mineral water* flow from separate openings only three feet apart at the Maytubby Springs in Oklahoma.

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SHOE protector, now patented, is a flexible cover shaped to fit over the front of the shoe with an elastic strap to pass around the heel. An arched metal spring fits over the toe.

Science News Letter, August 7, 1948

OIL INDICATOR FLASHES an amber or a red light on the automobile dashboard when the oil is one quart or two quarts, respectively, below normal. The lights are electrically connected to an indicator plug which replaces the old crankcase plug. The weight of the oil, transmitted to a diaphragm, activates an electrical resistor, allowing current to flow to the lights.

Science News Letter, August 7, 1948

SPONGE RUBBER of a new non-inflammable, low-cost type can be delivered through a hose, where it sponges at the nozzle, or cast in sheets as paper is made. It can be applied and vulcanized directly to upholstery materials and the backs of carpet to provide resiliency as well as flame resistance.

Science News Letter, August 7, 1948

OXYGEN TENT canopy of clear transparent plastic, shown in the picture, is satisfactory from the doctor's and the hospital's standpoint; important also, it lessens the dread that often comes to patients with other tents. The canopy can be discarded after one use or it can be sterilized with alcohol for reuse.

Science News Letter, August 7, 1948

ALL-PLASTIC TRUMPET which has high tonal quality is intended for the student field rather than to compete with standard makes of brass instruments. This low-cost trumpet is precision built, light in weight and has feather-touch valve action.

Science News Letter, August 7, 1948

DRY-SHAVE RAZOR, which may be carried around in a vest pocket and needs no shaving cream or electric motor, has a tiny T-shaped razor blade which is flipped back and forth in a slot as the razor is rolled back and forth across the face.

Science News Letter, August 7, 1948

HIGH-FREQUENCY ANTENNA, for automobile communications systems, is whip-like in appearance and is designed for mounting on the roof of the car. A special feature is a locking device, a single clamp which by pressure and biting into the metal roof from above and below provides a rigid mount.

Science News Letter, August 7, 1948

BODY PROTECTOR for baseball umpires is made of a rubber-like plastic over which is a cloth covering. Weighing only three pounds, it is about one-fourth the weight of older protectors. When deflated, it can be rolled into a small package.

Science News Letter, August 7, 1948

• Nature Ramblings *by Frank Thone* •

SERENE, cool, immaculate, the waterlily floats beneath the summer sun, with big, flat drops of water shining on its round, flat leaves. The waterlily has been the delight of poets of all ages and peoples. Of philosophers, too, who like to reflect how all that superb beauty has been extracted from the black mud of the bottom, where the rootstocks of the plant have their hold.

There are only a few kinds of waterlily in America. The white one is the most familiar, as well as the most beautiful. And it has the advantage over the European white waterlily in that it is very fragrant. Then we have a smaller yellow species, vulgarly called cow-lily or spatterdock, in the eastern states; but in the Rocky Mountains, where the white one does not grow, a second yellow species reaches a much larger size.

Real home of the waterlilies, however, is in the tropics. There they develop all sizes and colors, including delicate pinks, glowing reds and gorgeous blues. Many of the choicest tropical waterlilies have been introduced into cultivation in the temperate zones; fortunately it is possible to grow them to maturity and get blossoms in a single season. All you need to do is plant the seed after the water has warmed up sufficiently in the spring. You can even start tropical waterlilies by tossing the seed into a shallow farm pond that isn't too much churned up by wading cattle.

Flower of the Nymphs

One waterlily species, the *Victoria regia* of tropical South America, claims the distinction of having the largest of all known leaves. These natural rafts, with their upturned rims, have sufficient power of flotation to carry the weight of at least a child, if a framework of light lath is set down first to prevent the burden from being concentrated in one spot and thus breaking through the leaf tissue. The flowers of this giant-leaved waterlily, however, are relatively small and inconspicuous.

Botanical names sometimes sound harsh to the layman, but there can be no quarrel with the Latin name of the principal waterlily genus. There is some disagreement among botanists on this score, but both of the names that are in use are beautiful. One school calls it Castalia, which is the name of a fountain where the Muses of Greek mythology used to come. Other botanists, following the lead of the great Linnaeus, call it Nymphaea, which needs no explanation.

Science News Letter, August 7, 1948